

Jpn. J. Ent., 63(1): 95–105. March 25, 1995

Taxonomic Notes on *Nemophora bifasciatella* ISSIKI, with Descriptions of Its Two New Allied Species from Japan and the Russian Far East (Lepidoptera, Adelidae)

Toshiya HIROWATARI

Entomological Laboratory, College of Agriculture, University of
Osaka Prefecture, Sakai, Osaka, 593 Japan

Abstract New distributional data, illustrations of venation and genitalia, and a brief biological observation on *Nemophora bifasciatella* ISSIKI, 1930, are given and the lectotype is designated. Two new allied species, *sylvatica* and *stellata* are described from Japan and the Russian Far East, and Japan, respectively.

Key words: Adelidae; *Nemophora*; new species; Japan; the Russian Far East.

Introduction

Japanese fauna of the family Adelidae has only been fragmentarily studied (ISSIKI, 1930, etc.) and the tentative arrangement was made by MORIUTI (1982) checking up 21 species of *Nemophora* from Japan. However, no revisional work has been made since MATSUMURA (1932) listed Japanese Adelidae.

While arranging the specimens deposited in the collection of UOP, the author recognized that there exists some undescribed species in Japanese Adelidae. In the present paper, taxonomic notes on *N. bifasciatella* are given and its two new allied species are described from Japan and the Russian Far East.

Terminology used here is referred to NIELSEN (1980, 1985).

Abbreviations for institutions and collections:

- BLNU: Biological Laboratory, Nanzan University, Nagoya.
- OMNH: Osaka Museum of Natural History, Osaka.
- SEHU: Laboratory of Systematic Entomology, Hokkaido University, Sapporo.
- UOP: Entomological Laboratory, University of Osaka Prefecture, Sakai, Osaka.
- USNM: National Museum of Natural History, Smithsonian Institution, Washington, D.C.
- ZIN: Zoological Institute, Russian Academy of Sciences, St. Petersburg.
- ZLMU: Zoological Laboratory, Meijo University, Nagoya.

Nemophora bifasciatella ISSIKI

(Figs. 1-4, 9C, 10, 13E-G)

Nemophora bifasciatella ISSIKI, 1930, Ann. Mag. nat. Hist. (10) 6: 431. Lectotype ♂ (here designated) [examined]: ISSIKI, 1957, 13, pl. 2 fig. 32; OKANO, 1959, 277, pl. 183, fig. 17; MORIUTI, 1982, 55, pl. 1, fig. 36, [examined], pl. 236, fig. 1.

Male (Figs. 1, 3, 4). Wingspan 11-13 mm. Antenna 3.3-3.6 times as long as forewing.

As indicated in the original description, the legs are ochreous with distal portions of each tarsal segments distinctly paler, especially in hind tarsi, composing a distinct striped pattern. As regards the yellowish scales in postdiscal area of the forewing, it is sometimes developed into a semicircular patch as in the lectotype (Fig. 4), but presence of the scales varies individually.

In the original description, R_3 and R_4 of the forewing are said to be separate. MORIUTI (1982) also illustrated the venation of the female as such, but they are stalked in the examined male as shown in Fig. 9C.

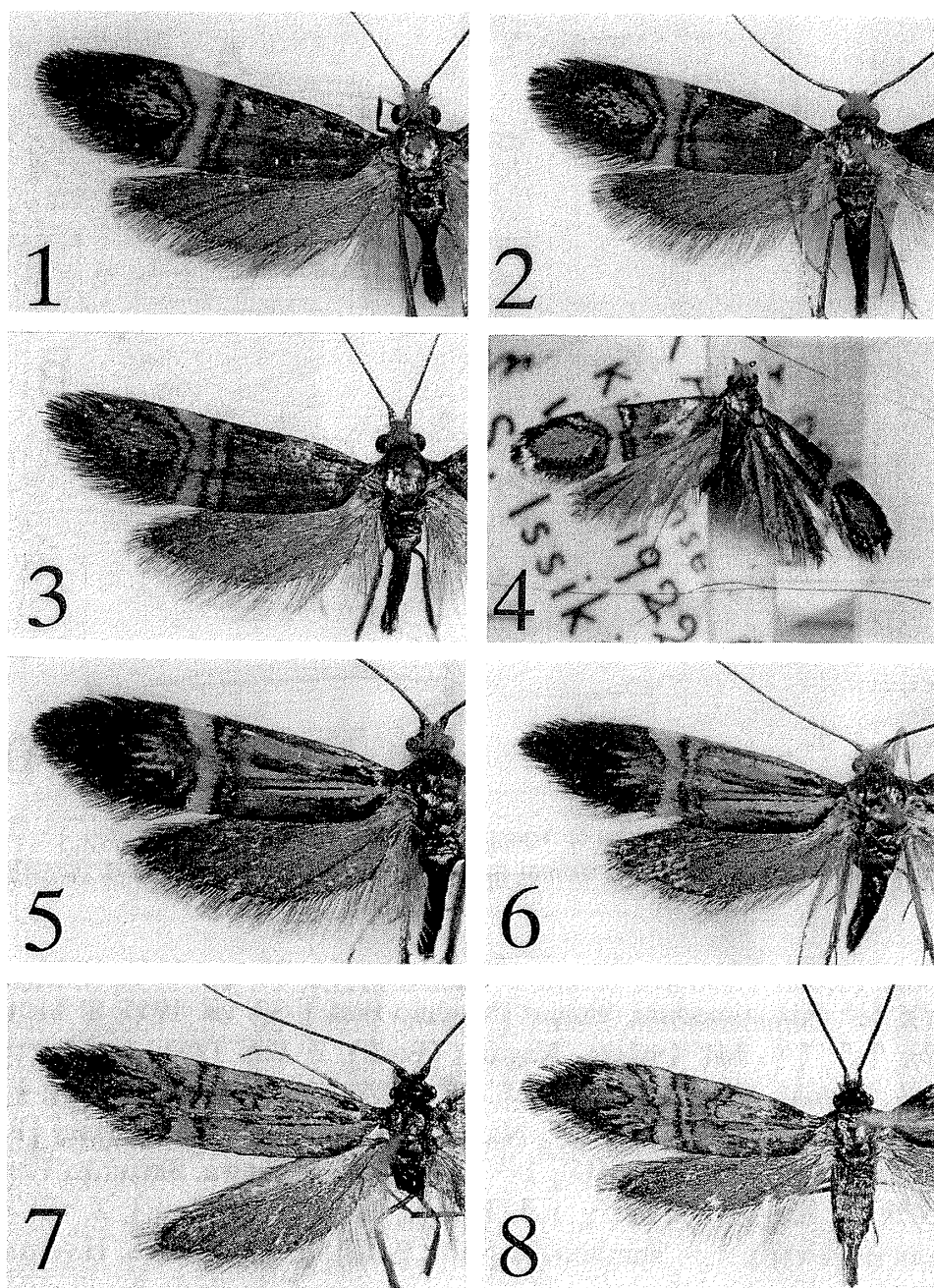
Female (Fig. 2). Wingspan 10-12 mm. Antenna 1.0-1.2 times as long as forewing, entirely slender as in the male.

Male genitalia (Fig. 10). Tegumen moderate in length; dorsal membranous area of a small circular window (Fig. 10C). Valva triangular, ventral corner with a distinct angular projection. Transtilla nearly W-shaped with sublateral anteriorly directed projections. Vinculum very long, about 2.9 times as long as valva. Aedeagus long; anterior portion weakly expanded laterally; vesica with a short rod at subbasal area of suprazonal sheath. Juxta arrow-shaped; head large with prominent barbs.

Female genitalia (Fig. 13E-G). Apophyses posteriores and anteriores of subequal in length, relatively long, 1.8 times as long as 7th tergite. Seventh tergite acuminate posteriorly with a pointed tip (Fig. 13F, G).

Type material. Lectotype ♂ (here designated): "KANTO, Kinuonsen [=Kawamata, Totigiken], 1 VIII 1922, S. Issiki/Issiki, Collection, 1972/Nemotitis, bifasciatella, Issiki, TYPE" (USNM) [examined]. Paralectotypes (here designated): 2♂, same label as lectotype, (USNM) [examined]; 3♀, same label as lectotype [not examined]; 4♂, 1♀, Kuzu, Naganoken, 12. vii. 1919, K. TAKEUCHI, [not examined]; 1♂, "HOKKAIDO, Tesio, VII 1916, S. Issiki/Issiki, Collection, 1972" (USNM) [examined].

Specimens examined. JAPAN [Hokkaido] 1♂, 2♀, Nopporo, 2, viii. 1963, T. KUMATA (SEHU); 1♀, Soranuma, Sapporo, 5. viii. 1967, T. KUMATA (SEHU); 1♂, 1♀, Kannonzawa, Misumai, Sapporo, 2. viii. 1993, Y. SAKAMAKI (UOP); 1♂, Mt. Toishiyama, Sapporo, 28. vii. 1993, Y. NAKATANI (UOP); 1♂, Arai-Pass, Otaru-city, 1-2. viii. 1968, Se. YAMANE (SEHU), [Honshu] 1♂, Mt. Hayachine, Iwateken, 25. vii. 1965, T. OKU (SEHU); 2♂,



Figs. 1-8. *Nemophora* spp. — 1-4. *N. bifasciatella* ISSIKI. 1, ♂, Amo-toge, Gifu, Honshu; 2, ♀, same label; 3, ♂, Kuju, Ohita, Kyushu; 4, Lectotype ♂, (USNM); 5, *N. sylvatica* sp. nov., ♂, holotype; 6, ditto, ♀, paratype, Toyama, Honshu; 7, *N. stellata* sp. nov., ♂, holotype; 8, ditto, ♀, paratype, Ehime, Shikoku.

Kazawaonsen, Gunma Pref., 7-8. viii. 1970, F. KOMAI (UOP); 6♂, Mt. Hakusan (2,300-2,400 m), 31. vii. 1979, Y. ARITA (ZLMU); 1♂, Mt. Iouzen, Fukumitsu-Town, Toyama Pref., 10. vii. 1991, T. UEDA (UOP); 1♂, 1♀, Sugitoge, Kaga [Ishikawa Pref.], 29. vii. 1961, T. SAITO (UOP); 1♂, Toku-

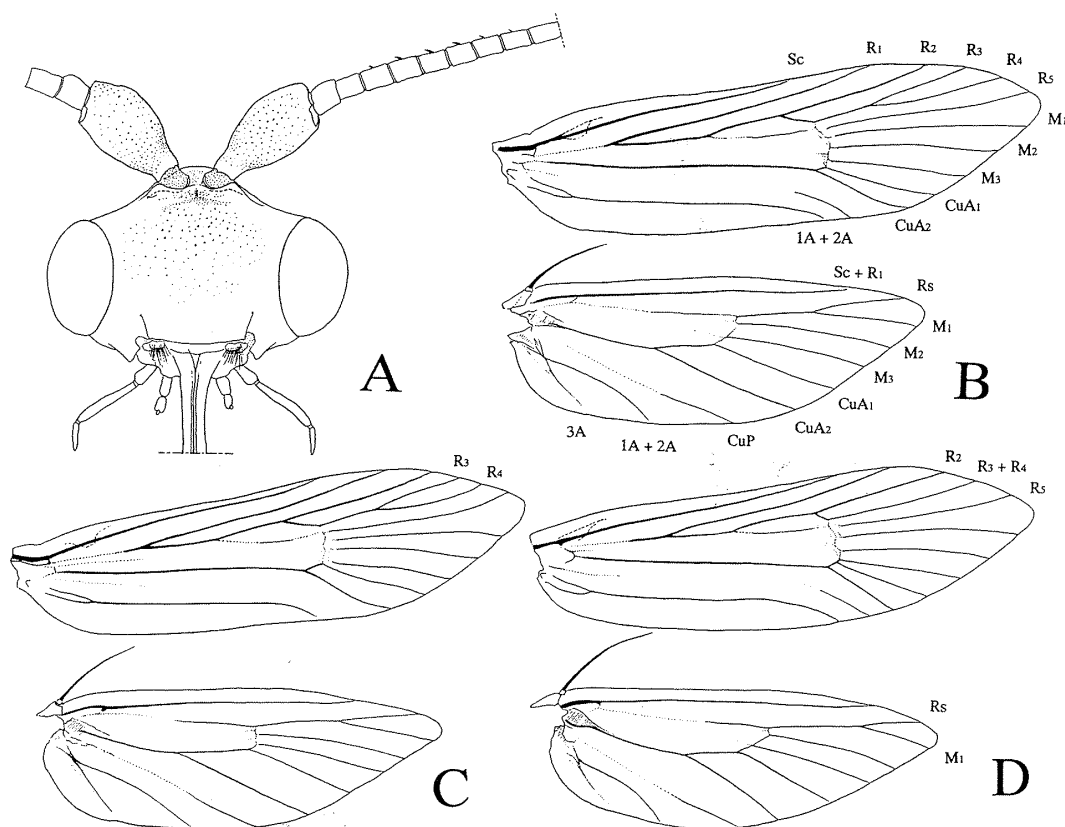


Fig. 9. Head and wing venations of *Nemophora* spp. A, B, *N. sylvatica* sp. nov., ♂; C, *N. bifasciatella* ISSIKI, ♂; D, *N. stellata* sp. nov., ♂. — A, Head; B–D, wing venations.

gootooge (1,600–2,135 m), Sinano [Nagano Pref.], 27. vii. 1955, S. MORIUTI (UOP); 2♂, Simazimadani, Sinano [Nagano Pref.], 30. vii. 1955, S. MORIUTI (UOP); 7♂, 1♀, Mt. Ontake, Nagano [Pref.], 2. viii. 1953, A. MUTUURA; 3♂, 1♀, Outaki, Kiso, Nagano Pref., 26. vii. 1981, H. HARA (UOP); 4♂, 2. viii. 1981, same label (UOP); 1♂, Narada, Minamikuma, Yamanashi [Pref.], 28. vii. 1977, Y. ARITA (ZLMU); 1♂, Dainichitoge, Ikawa, Shizuoka Pref. 27. vii. 1975, Y. ARITA (ZLMU); 1♂, Hirayu, Hida [Gifu Pref.], 2. viii. 1953, TAKEUCHI (UOP); 1♂, Shinhodaka [Gifu Pref.], 6. viii. 1978, S. HASHIMOTO (UOP); 1♂, 1♀, Hodakaonsen, Kamitakaramura, Gifu Pref., 2. viii. 1967, Y. ARITA (UOP), 13♂, 3♀, Amoo-toge (1,300 m), Gifu-ken, 1. viii. 1979, Y. ARITA (ZLMU); 1♂, [Hirugano-kogen, Takawashi-mura, Gifu-ken, 23. vii. 1991, T. MANO] (in Japanese) (UOP); 2♂, Mt. Gozaisyo, Ise [Mie Pref.], 25. vii. 1957, T. YASUDA (UOP); 1♂, Mt. Wasamata, Nara Pref., 23. vii. 1991, T. HIROWATARI (UOP); 3♂, 3♀, 12. viii. 1993, Y. NAKATANI, same locality (UOP); 2♂, Mt. Daisen [Tottori Pref.], 15. vii. 1920, TAKEUCHI (UOP); [Kyushu] 12♂, 9♀, Yoshibu, Kuju, Oita [Pref.], 7. viii. 1993, T. HIROWATARI (UOP).

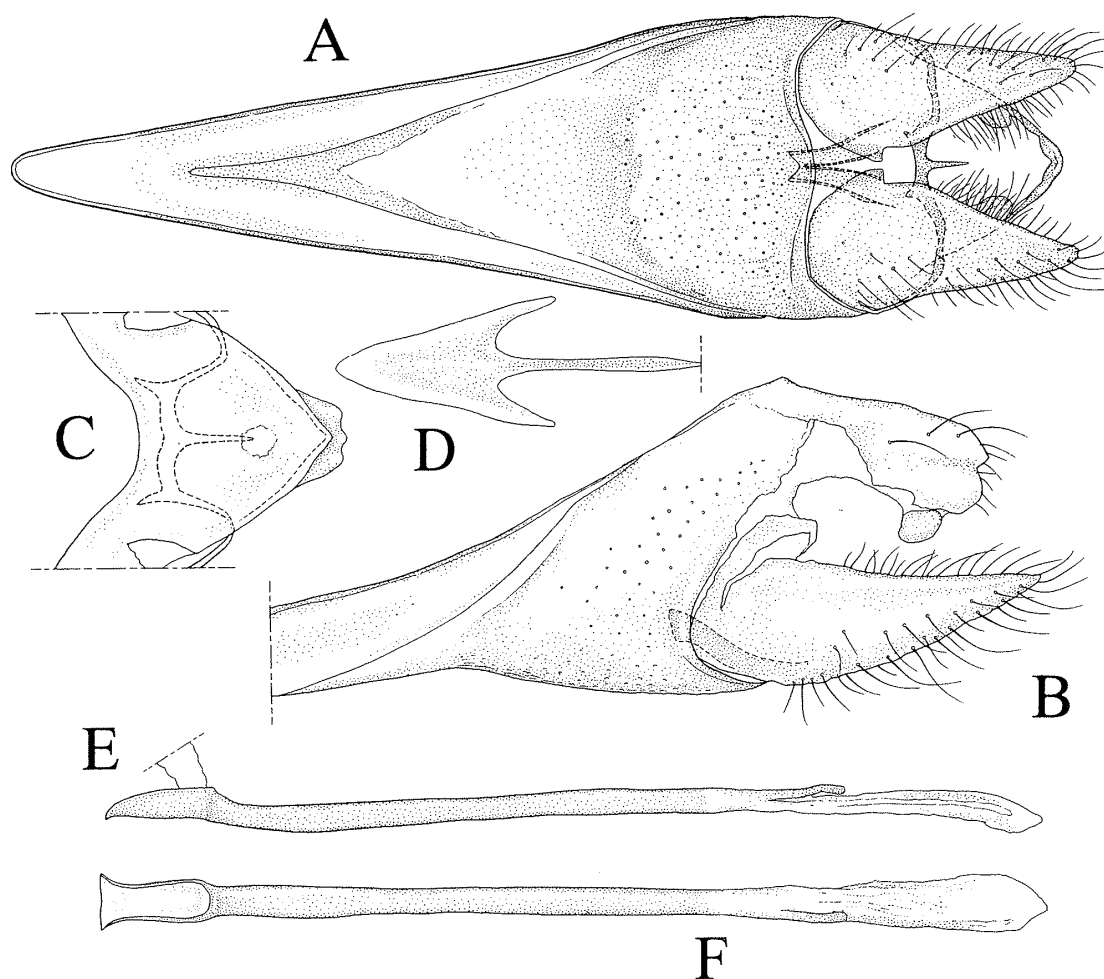


Fig. 10. Male genitalia of *Nemophora bifasciatella* ISSIKI., Amo-toge, Gifu. A, Whole genitalia except aedeagus in ventral view; B, *ditto*, lateral view; C, dorsum in dorsal view; D, juxta in ventral view; E, aedeagus in lateral view; F, *ditto*, dorsal view.

Distribution. JAPAN (Hokkaido, Honshu, Shikoku, Kyushu)

Remarks. This species has been said to occur in mountainous area of central Honshu and Hokkaido (ISSIKI, 1952; OKANO, 1959; MORIUTI, 1982). However, this species is widely distributed in Honshu (e.g. Mt. Wasamata, Nara Pref., Mt. Daisen, Tottori Pref.). In addition, it is newly recorded here from Shikoku and Kyushu. At this moment, this species is confined to Japan.

Though the biology of this species has little been reported, the author observed the males of this species flying actively in the evening twilight (18:00–19:00) above the flowers of *Hydrangea paniculata* (Saxifragaceae) at Yoshibu, Kuju, Oita Pref., Kyushu. At most 4–5 males flew together and it may be regarded as a small scale ‘swarming’. Some females were also obtained from the flowers and it is possible that the plant is exploited not only as nectar resource but also utilized for ovipositing.

Nemophora sylvaica sp. nov.

(Figs. 5, 6, 9A–B, 11, 13A–D)

Male (Figs. 5, 6). Wingspan 12–14 mm. Head with raised golden yellow hair-scales; face smooth and bronzy. Labial palpus with raised yellowish scales and apical segment with blackish brown appressed scales. Antenna 3.0–3.5 times as long as forewing, basally convered with appressed dark bronzy hairs, distal half paler, apical portion silvery white. Legs almost evenly ochereous. Forewing with R_3 and R_4 stalked; basal half golden yellow, with black scales at costal and dorsal base; a narrow bronzy streak along basal half of costa; a longitudinal fascia of bluish-leadenn metallic scales in discal cell and a black line below the cell; a pair of black-margined bluish-leadenn transverse

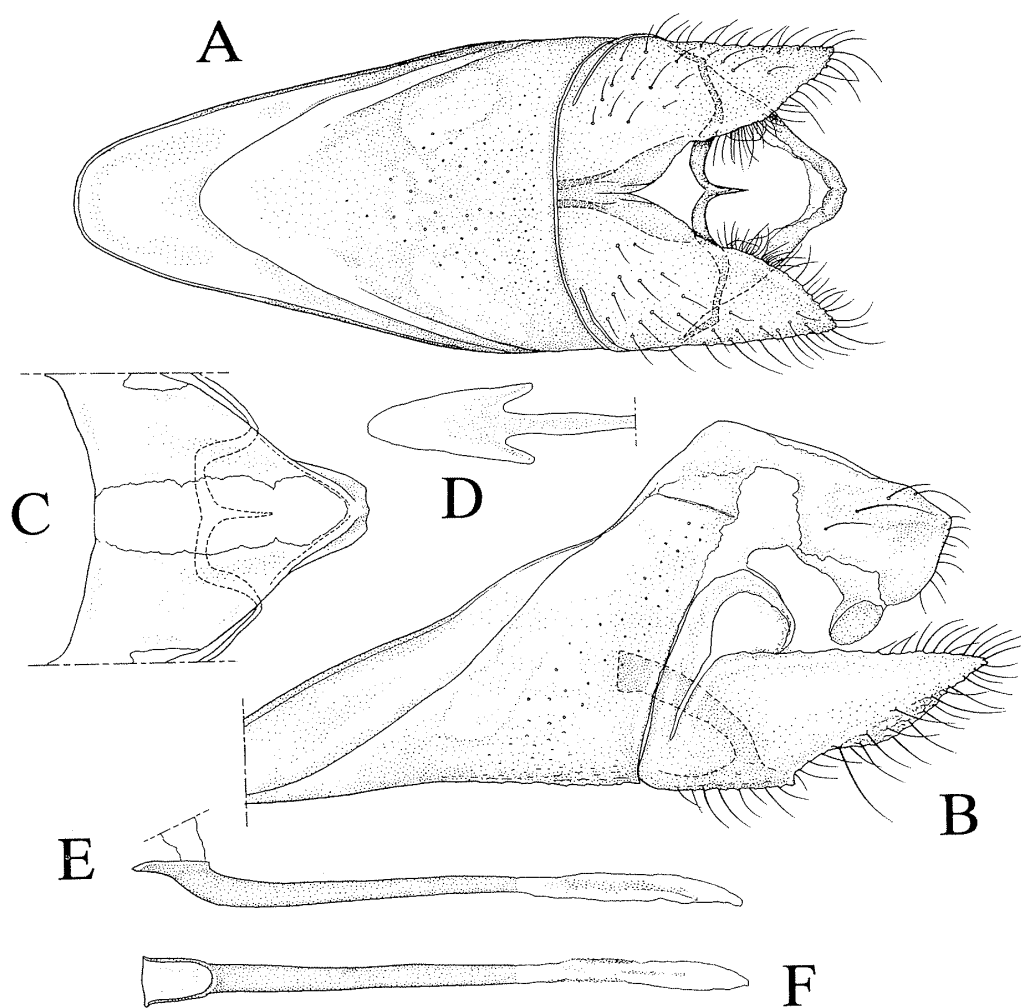


Fig. 11. Male genitalia of *Nemophora sylvaica* sp. nov., Paratype, Outaki, Nagano. A, Whole genitalia except aedeagus in ventral view; B, *ditto*, lateral view; C, dorsum in dorsal view; D, juxta in ventral view; E, aedeagus in lateral view; F, *ditto*, dorsal view.

fasciae present as in *bifasciatella*, but the outer fascia usually separated at middle by yellowish scales which continue from yellowish transverse band between the fasciae forming a fork-like marking subapically.

Female (Fig. 6). Wingspan 12–14 mm. Antenna 1.1–1.2 times as long as forewing, entirely slender.

Male genitalia (Fig. 11). Tegumen relatively long and broad; dorsal membranous area band-like (Fig. 11C). Valva short and broad, ventral corner rounded. Transtilla nealy W-shaped, sublateral anteriorly directed projections absent. Vinculum relatively short and broad, about 1.7 times as long as valva, tongue-shaped. Aedeagus short; anterior portion not expanded laterally; vesica with indistinct spines laterally. Juxta arrow-shaped; head short and broad with rounded tip.

Female genitalia (Fig. 13A–D). Apophyses posteriores and anteriores of subequal in length, 1.5 times as long as 7th tergite. Seventh tergite emerginate posteriorly with a dorsally curved tip (Fig. 13C, D).

Holotype: ♂, Tateyama-onsen (1,200 m), Toyama Pref., 5. viii. 1975, Y. ARITA, In UOP. *Paratypes*. RUSSIA, 1♂, [Kunashir, surr. of Sernovodsk, 5. vii. 1967, Zalbello] (in Russian) (ZIN); 1♀, [Sakhalin, Yuzhno-Sakhalinsk, 2. vii. 1983, S. Yu. SINEV] (in Russian) (ZIN); JAPAN, [Hokkaido] 1♂, Nakayama Toge, 6. vii. [19] 61, T. KUMATA (SEHU); 2♂, Takinoue, Kitami, 6. vii. 1974, T. Kumata (SEHU), 3♀, Sounkyo, 29. vii. 1961, T. KUMATA (SEHU); 1♂, viii. 1963, same locality and collector (SEHU); [Ooyubari, 3. vii. 1965, S. YAMANE] (in Japanese) (UOP); 1♀, Zyozankei, 18. vi. 1964, T. KUMATA (SEHU); [Honshu] 1♂, Kazawa, [Gunma Pref.], 3. viii. 1929, TAKEUCHI (UOP); 1♂, Kazawa-onsen, Gunma Pref. 7–8. viii. 1970, F. KOMAI (UOP); 2♀, Tokusawa, Nagano, 24. vii. 1955, A. MUTUURA (UOP); 1♀, same data as holotype (UOP); 1♂, Kaga [Ishikawa Pref.], Hakusan, 29. vii. 1951, T. YASUDA (USNM); 1♂, Sugitoge, Kaga, 29. vii. 1961, T. SAITO (UOP); 2♀, Tokugootooge, Sinano [Nagano Pref.], 6. viii. 1958, S. MORIUTI (UOP); 1♂, same locality, 5. viii. 1967, Y. ARITA (UOP); 1♀, 17. viii. 1967, same locality and collector (UOP); 2♂, Outaki, Kiso, Nagano Pref., 2. viii. 1981, H. HARA (UOP); 3♂, 3♀, same locality, 17. viii. 1992, T. HIROWATARI (UOP); 2♂, Kisokomagatake, Nagano Pref. 18. viii. 1992, T. HIROWATARI (UOP); 2♀, Narada, Minamikuma, Yamanashi Pref., 27. vii. 1977, Y. ARITA (ZLMU); 1♂, Dainichitoge, Ikawa, Shizuoka Pref., 27. vii. 1975, Y. ARITA (ZLMU); 1♂, Amo-toge (1,300 m), Gifu-ken, 1. viii. 1979, Y. ARITA (ZLMU); 9♂, 2♀, Mt. Wasamata, Nara Pref., 22. viii. 1994, K. TENMA; 5♂, 3♀, same label, T. HIROWATARI; 1♂, same label, T. UEDA; 1♂, 1♀, Mt. Obakodake, Nara Pref., 5. viii. 1979. K. YASUDA (UOP); 1♀, Daisen, [Tottori Pref.], 15. vii. 1920, TAKEUCHI (UOP); 1♂, 14. vii. 1950, S. ISSIKI (USNM); 1♂, 11. vii. 1950, same label (USNM), [Shikoku] 1♂, Mt. Ishizuchi-san (1,500–1,900 m), 13.

vii. 1979, Y. ARITA (ZLMU).

Distribution. RUSSIA (Far East), JAPAN (Hokkaido, Honshu, Shikoku).

Remarks. This new species externally resembles *N. bifasciatella*, but easily distinguished from it by i) fork-like subapical marking of the forewing, ii) evenly ochereous hind tibia and tarsi, iii) short and broad vinculum of the male genitalia, while in *bifasciatella* i) the subapical marking is circular or nearly so, ii) white and ochereous stripe pattern is present in the hind tibia and tarsi, and iii) the vinculum is long and slender.

The new species occurs sympatrically with *bifasciatella* in some localities of Hokkaido and Honshu. The moths of the both species fly from mid July to August. Although these two species resemble externally, the genitalia show that they are considerably diverged.

Nemophora stellata sp. nov.

(Figs. 7, 8, 9D, 12, 13H-J)

Male (Figs. 7, 8). Wingspan 11–12 mm. Head with raised blackish hair-scales; face smooth and bronzy. Labial palpus with raised blackish brown scales. Antenna 3.2–3.8 times as long as forewing, basal 1/5 dark bronzy, distinctly paler distally, apical 2/3 silvery white. Legs almost evenly straw yellow, somewhat irrorated with dark brown at outer surface of hind tibia and tarsi. Forewing with R_3 and R_4 connate; basal half golden yellow; base to basal 2/5 with three, i.e., costal, median and dorsal, longitudinal black-margined bluish-lead metallic fascia; at the basal 2/5 the costal and dorsal ones connected by a transverse lacerated fascia which is outwardly curved at middle; a pair of black-margined bluish-lead transverse fasciae present as in the preceding species at postdiscal area.

Female (Fig. 8). Wingspan 9–10 mm. Antenna 1.0–1.1 times as long as forewing, entirely slender.

Male genitalia (Fig. 12). Tegumen moderate in length; dorsal membranous area broad (Fig. 12C). Valva as in *sylvatica*, ventral corner weakly angled. Transtilla nearly W-shaped, as in *bifasciatella*. Vinculum relatively long, about 2.4 times as long as valva, anterior half narrowed. Aedeagus long; anterior portion expanded laterally, bell-like in dorsal view (Fig. 12F); vesica with many minute spines laterally and a pair of distinct rod-like processes apically. Juxta arrow-shaped; head very narrow with aristate tip.

Female genitalia (Fig. 13H-J). Apophyses posteriores and anteriores of subequal in length, relatively short, 1.2 times as long as 7th tergite. Seventh tergite truncate posteriorly (Fig. 13I, J).

Holotype: ♂, Kyushu, Hikosan, Buzen [Fukuoka Pref.], 31. v. 1959, H. KUROKO. In UOP. Paratypes [Shikoku] 2♂, 2♀, Omogokei [L.T.] Mts.

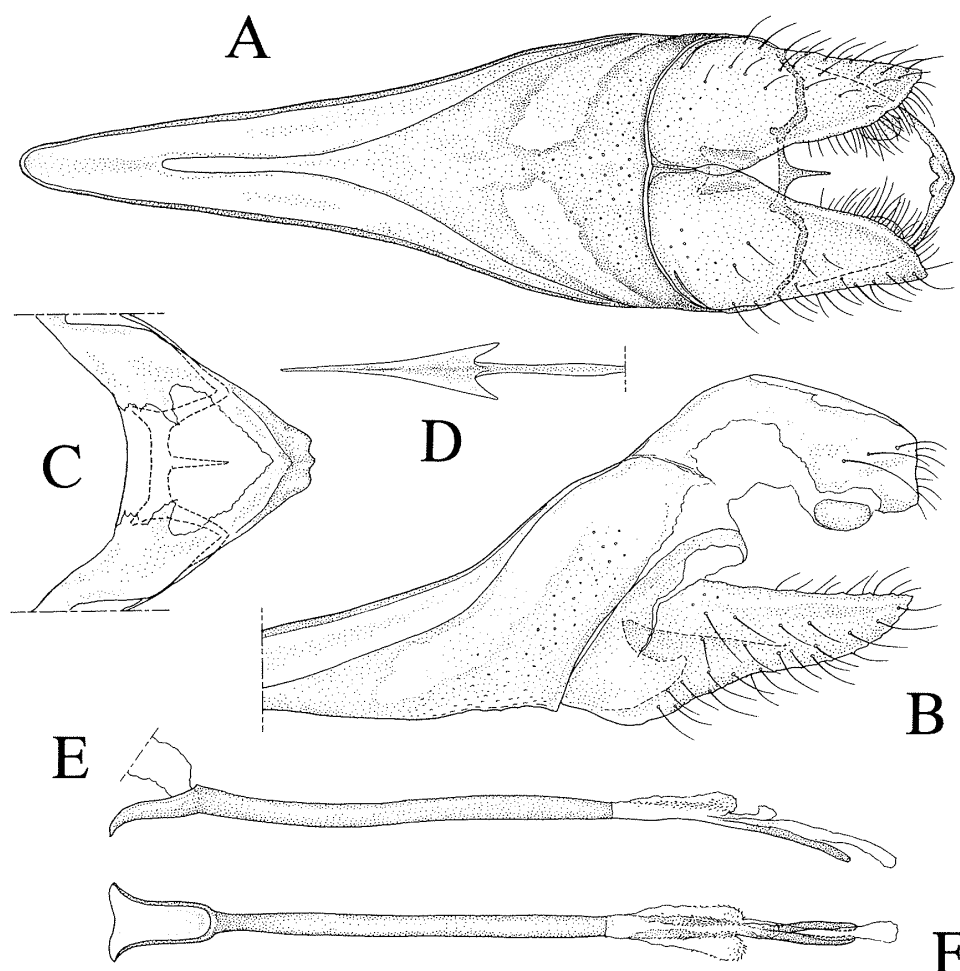


Fig. 12. Male genitalia of *Nemophora stellata* sp. nov., Paratype, Mt. Hakuchozan, Kumamoto. A, Whole genitalia except aedeagus in ventral view; B, *ditto*, lateral view; C, dorsum in dorsal view; D, juxta in ventral view; E, aedeagus in lateral view; F, *ditto*, dorsal view.

Ishizuchi, Ehime Pref. 14. vi. 1981, I. KANAZAWA (OMNH); 2 ♀, 15. vi. 1981, same locality and collector (OMNH); [Kyushu] 1 ♂, Higo [Kumamoto Pref.], Nai-daijin-kei, 25. v. 1952, S. ISSIKI (USNM); 1 ♂, 1 ♀, Mt. Hakuchozan, Izumi-mura (1,300 m), Kumamoto Pref. 5. vi. 1980, [L.T.], N. KODA (BLNU); 1 ♂, Mt. Shiratori [= Hakuchozan], Kumamoto Pref. 9–10. vi. 1990, T. HIROWATARI (UOP).

Distribution. JAPAN (Shikoku, Kyushu).

Remarks. This species is easily distinguished from the two species by the black hair-scales of head and distinct wing markings with three transverse bluish-leadene fasciae. This species is confined to mountainous area of Shikoku and Kyushu, Japan.

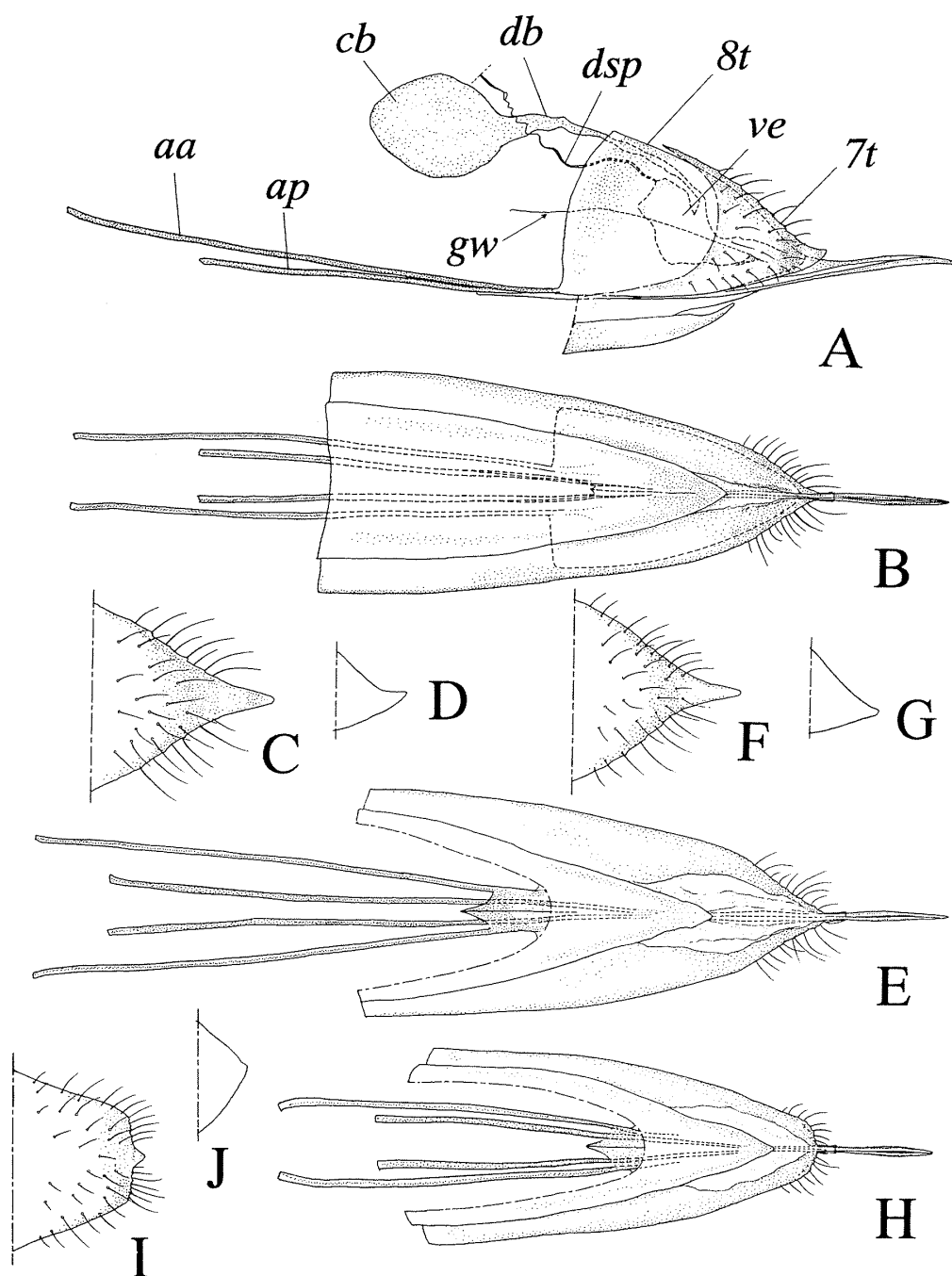


Fig. 13. Female genitalia of *Nemophora* spp. A–D, *N. sylvatica* sp. nov., Paratype, Tokugotoge, Nagano; E–G, *N. bifasciatella* Issiki, Mt. Wasamata, Nara; H–J, *N. stellata* sp. nov., Paratype, Omogokei, Ehime. — A, Terminalia in lateral view; B, E, H, ditto, lateral view; C, F, I, posterior portion of 7th tergite; D, G, J: ditto (tip), lateral view.

Acknowledgements

I wish to express particular thanks to Michail KOZLOV (University of

Turku, Turku) for his valuable information on the Russian Far East *Nemophora*, and kind suggestion in publishing this paper. My cordial thanks are also due to Ebbe NIELSEN (CSIRO, Canberra), for his kind reading of the manuscript and critical advice. Hiroshi KUROKO (Hanan, Osaka), Tosiro YASUDA and Sigeru MORIUTI (UOP) gave me instructive suggestion on Japanese *Nemophora*.

I am also indebted to the following entomologists for their kind help and for valuable specimens: Donald DAVIS (USNM), Tosio KUMATA and Yoshitaka SAKAMAKI (SEHU), Takahiro MANO (Miwa, Aichi Pref.), Yutaka ARITA and Satoshi HASHIMOTO (ZLMU), Nobutoyo KODA (BLNU) Itaru KANAZAWA (OMNH), Furumi KOMAI (Osaka University of Arts, Osaka), Yukinobu NAKATANI, Tatsuya UEDA and Kazuhisa TENMA (UOP).

References

- NIELSEN, E. S., 1980. A cladistic analysis of the Holarctic genera of adelid moths (Lepidoptera: Incurvarioidea). *Ent. Scand.*, **11**: 161–178.
- 1985. A taxonomic review of the adelid genus *Nematopogon* ZELLER (Lepidoptera: Incurvarioidea). *Ent. Scand. Suppl.*, **25**: 1–66.
- ISSIKI, S., 1930. New Japanese and Formosan Microlepidoptera. *Ann. Mag. nat. Hist.*, (10) **6**: 422–431.
- 1957. Adelidae. In ESAKI, T., ISSIKI, S., INOUE, H., MUTUURA, A., OGATA, M. and OKAGAKI, H. *Icones Heterocerorum Japonicorum in Coloribus Naturalibus*. Vol. [1]: i–xix, 1–318, pls. 1–64. Hoikusha, Osaka. (in Japanese.)
- MATSUMURA, S., 1932. Adelidae in Japan. *Ins. Matsum.*, **6**: 121–127, pl. 4.
- MORIUTI, S., 1982. Incurvariidae, pp. 51–56, pl. 1. In INOUE, H., SUGI, S., KUROKO, H., MORIUTI, S. & KAWABE, A. (eds.). *Moths of Japan*. 1, 2, 966 pp., 392 pls., 552 pp. Kodansha, Tokyo. (in Japanese.)
- OKANO, M., 1959. Adelidae, pp. 277–278, pl. 183. In INOUE, H., OKANO, M., SHIRÔZU, T., SUGI, S. & YAMAMOTO, H. *Iconographia Insectorum Colore naturali edita*, Vol. 1 (Lepidoptera): i–xiv, 1–284, 1–67, 1–40, 184 pls. Hokuryukan, Tokyo. (In Japanese.)

(Received July 5, 1994; Accepted September 3, 1994)